SECTION 404
OPEN-GRADED FRICTION COURSE

404.01 DESCRIPTION. This work is the mixing, spreading, and compacting of a mineral aggregate and bitumen on the prepared surface of an existing roadway pavement.

404.02 MATERIALS.

404.02.1 Aggregate. Furnish aggregate meeting the applicable requirements of Subsection 701.03.

404.02.2 Bituminous Material. Furnish bituminous material of the type and grade specified in the Contract and meeting Sections 402 and 702 requirements.

404.02.3 Anti-Stripping Additive. Furnish anti-stripping additive, if required, that meets the Contract requirements and Subsection 401.02.5(B).

404.03 CONSTRUCTION REQUIREMENTS.

404.03.1 Mix Design. Submit to the Project Manager the average of the gradation control test results and the blending proportions if more than one stockpile is to be used. Assure the aggregate gradations are within the gradation limits in Table 701-16 of Subsection 701.03.3.

Provide the Project Manager aggregate samples representing production at least 15 days before mixing operations. The Department has 15 days to issue a mix design after receipt of samples by the laboratory. Do not produce mix until a mix design is issued. The mix design establishes the recommended asphalt content, mixing and laydown temperature, and any additives required.

404.03.2 Aggregate Production. Produce and furnish material within the limits of Table 701-16 at the point of bituminizing.

Be responsible for all sampling and testing to control gradations and mechanical fracture during aggregate production. Establish a process quality control plan addressing the following:

1. Equipment Maintenance;
2. Equipment Calibration;
3. Stockpiling and materials handling;
4. Sampling and testing of component materials.

404.03.3 Acceptance Sampling and Testing.

A. Sampling.

1. **Mechanical Fracture.** Mechanical fracture tests will be by MT-217 on random samples selected by the Project Manager.

2. **Aggregate Gradation.** Gradation test samples are randomly selected by the Project Manager. Each sample will represent approximately 400 tons (360 mt). The Project Manager may require additional test samples.

   Five samples will represent approximately 2,000 tons (1800 mt) and constitutes a lot whenever production schedules and material continuity permit. The Project Manager may establish a lot of the quantity represented by 3 to 7 consecutive random samples when there are short production runs, significant material changes, or other unusual characteristics of the work.

   Gradation tests will be by MT-202.

B. Acceptance.

1. **Mechanical Fracture.** The aggregate will be evaluated for mechanical fracture requirements based on test results of samples selected by the Project Manager. Results are acceptable if the average of all tests are within specification limits and not more than 1 test out of any 5 consecutive tests is outside these limits.

   Do not begin plant mixing operations until the stockpiled aggregates meet these requirements.

2. **Gradation.** OGFC is accepted on a lot by lot basis under Subsection 105.03.2.

404.03.4 Equipment. Use a mixing plant, paver, and other equipment, excluding rollers, that meet the applicable requirements of Section 401 and Section 210.

Use non-vibrating, flat, smooth, steel wheeled, self-propelled rollers weighing between 175 to 225 pounds per linear inch (79.5 to 102 kg per 25 mm) of rolling width per drum. Use lighter rollers if aggregate breakage occurs.

404.03.5 Traffic Control. Establish traffic control meeting the approved traffic control plan and Section 618.

404.03.6 Paving Dates and Weather Limitations. Do not place open graded friction coarse from September 15 to May 15 of the following year.

Place open graded friction coarse only during daylight hours; when the surface is dry; when the surface temperature is a minimum 60 °F (16 °C); and when the ambient temperature is above 60 °F (16 °C).

The Project Manager may suspend paving due to weather considered detrimental to the work.

404.03.7 Preparation of Existing Surface. Complete all required patching, leveling, and crack filling before placing the OGFC.

Clean loose and defective material from holes and depressions to sound pavement. Coat the surface with an approved bituminous material, and fill with a hot-mix asphalt patching material. Compact patched areas to produce a tight, smooth surface matching the adjacent pavement area.

Apply a thin coating of bituminous material to the contact surfaces of curbing, gutters, manholes, and other structure surfaces before placing the OGFC.

Remove all dust, dirt, and foreign matter on the roadway before applying the first application of bituminous material.

404.03.8 Tack Coat. Apply tack coat at 0.02 to 0.05 gallons per square yard (0.1 to 0.23 liters per square meter) of SS-1 emulsified asphalt or as directed.

To provide complete coverage, the emulsion may be diluted meeting the requirements of Subsection 407.03.3. Apply diluted emulsion at a rate proportionate to the dilution rate.

Assure the emulsified asphalt is fully cured before placing the OGFC.

404.03.9 Mixing. Dry and heat the mineral aggregate to a maximum temperature of 275 °F (135 °C). Collect and dispose of dust from heating the aggregate or return it to the hot elevator.

Thoroughly mix to uniformly coat the mineral aggregate with asphalt cement. Heat to the mixing temperature specified in the mix design formula.

Use burner fuel meeting Subsection 401.03.2(A)(13) requirements.

404.03.10 Dumping. The OGFC mixture may be dumped directly into the paver or windrowed on the pavement ahead of the paver.

404.03.11 Spreading. Spread the OGFC with a paver or pavers meeting Subsection 401.03.2(F)(1) requirements.

Produce longitudinal and transverse joints meeting Subsection 401.03.11 requirements.

404.03.12 Rolling. Immediately after placing the OGFC, roll the entire surface once.

Begin rolling on the low side of the paving lane and work towards centerline longitudinally and parallel. Overlap the preceding strip by at least 6-inches (150 mm).

Operate rollers to prevent shoving, distortion, break rocks, or stripping under the roller. Continue rolling until the OGFC is consolidated and bonded to the underlying surface course.

404.03.13 Finishing. Finish the surface to the plan dimensions.

Correct all defective areas immediately at Contractor expense. Remove and replace defective areas with new material and compact meeting the adjacent surface.

Do not permit traffic on the OGFC without the Project Manager's approval.

404.03.14 Surface Tolerances. Finish the surface meeting Subsection 401.03.14 requirements.

404.04 METHOD OF MEASUREMENT.

404.04.1 Open-Graded Friction Course. OGFC mix is measured by the ton (metric ton) under Subsection 401.04.1.

404.04.2 Bituminous Material. Bituminous material is measured by the U.S. gallon (L) or the ton (metric ton) under Subsection 401.04.2.

404.04.3 Mineral Filler and Anti-Stripping Additive. Mineral filler and anti-stripping additive is measured under Subsections 401.04.3 and 401.04.5 respectively.

404.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is measured under the following:

Pay Item	Pay Unit
Open Graded Friction Course	Ton (metric ton)
Bituminous Material	Gallon (liter) or Ton (metric ton)
Mineral Filler	Ton (metric ton)
Anti-Stripping Additive	Ton (metric ton)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the Contract. Cleaning the roadway surface before placing the OGFC mixture is included in payment for other items of this Section.